



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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JUL 10 2014

Benjamin Beasley, Branch Chief  
Plant Licensing Branch I-1 (LPL1-1)  
Mail Stop O-8C2A  
U.S. Nuclear Regulatory Commission  
Washington DC 20555-0001

Re: Clean Water Act Permit for Pilgrim Station in Plymouth, MA, and Nuclear Safety Issues  
Alleged by the Facility

Dear Mr. Beasley:

The Region 1 office of the United States Environmental Protection Agency (EPA or the Agency) is in the process of reissuing a National Pollutant Discharge Elimination System (NPDES) permit to Entergy for the Pilgrim Nuclear Power Station (PNPS) in Plymouth, Massachusetts. Under the Clean Water Act, 33 U.S.C. §§ 1251, *et seq.*, PNPS requires an NPDES permit to authorize its withdrawal of water from Cape Cod Bay for use as cooling water and its discharges of pollutants to the bay. *See* 33 U.S.C. §§ 1311(a) and 1342(a). By this letter, EPA is initiating a consultation with the Nuclear Regulatory Commission (NRC) regarding whether Entergy's claim of nuclear safety concerns relative to possible changes at the plant related to potential new NPDES permit conditions are warranted.

As part of EPA's data gathering process to support development of a new permit for PNPS, the Agency requested information from Entergy regarding the feasibility of implementing alternative technological and operational modifications at the Station to reduce the impingement and entrainment of fish and other organisms resulting from the facility's withdrawal of water from the bay through its Cooling Water Intake Structure (CWIS). In response, Entergy submitted a report to EPA dated July 1, 2008. This report evaluated the feasibility of several technological and/or operational changes geared to reduce impingement mortality and entrainment at PNPS. Entergy cited nuclear safety concerns as a primary or contributing reason for finding certain technological and operational options to be infeasible. In light of the concerns raised by Entergy, Region 1 is initiating this consultation to seek the NRC's views concerning whether any of the technology or operational alternatives under consideration for PNPS would result in a conflict with a safety requirement established by the NRC.

In the draft NPDES permit that is being prepared, EPA will propose permit limits based on its determination of the Best Technology Available (BTA) for minimizing the adverse environmental effects of PNPS's CWIS, including impingement and entrainment. This BTA is likely to entail a combination of measures that PNPS would be required to implement to reduce impingement and entrainment. As part of rendering its BTA determination, EPA must

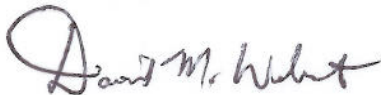
independently evaluate Entergy's technology assessment. Furthermore, EPA must consider, among other things, (a) which technologies and operational measures would be feasible at Pilgrim, (b) the extent to which the options would reduce impingement and entrainment impacts, (c) the cost of each option, (d) the engineering challenges presented by the option, and (e) the energy and non-water environmental effects of the option.

Therefore, to assist EPA in its evaluations, the Agency requests the NRC's views regarding whether any of the technologies or operational measures under consideration present a conflict with the NRC's nuclear safety requirements as they relate to Pilgrim Station. For your review, I have emailed you Entergy's entire (redacted) 2008 submittal which cites nuclear safety concerns associated with the implementation of most of the technologies that were considered in Entergy's analysis. In addition, I have attached the submittal's cover letter as well as Table 14 on Pages 56 and 57 for a summary of alternatives considered by Entergy.

EPA is eager to hear from the NRC as soon as possible because the Agency is hard at work on developing the new draft permit for PNPS and would like to have the benefit of the NRC's viewpoints to help inform our analysis. EPA is available to meet with you and your staff to discuss these matters at your convenience and provide additional information as necessary.

In addition to a possible meeting, EPA would like to set up a phone call to discuss this matter. Please contact George Papadopoulos of the Industrial Permits Section at (617) 918-1579 to arrange a phone call to discuss this matter further.

Sincerely,

A handwritten signature in dark ink, appearing to read "David M. Webster". The signature is fluid and cursive, with the first name "David" being more prominent.

David M. Webster, Chief  
Water Permits Branch  
Office of Ecosystem Protection

cc: Nadiyah Morgan, US NRC  
Marcus Zobrist, EPA/OW  
David E. Noyes, Entergy



## 8 Conclusions

Based on the feasibility and engineering evaluations documented in Sections 5 through 7, Table 14 summarizes the alternative technologies and operational measures. With the exception of VSPs, no proven technology was shown to significantly reduce entrainment or impingement mortality.

**Table 14 Summary of Alternatives**

Technology or Operational Measure	Evaluation Conclusions
Closed-Loop Cooling	Conversion of PNPS to closed-loop cooling dramatically increases design parameters above several basic equipment limitations. To ensure equipment limitations are not unsafely exceeded, the Station's net thermal load must be reduced to such an extent that nuclear safety concerns render the Station completely inoperable a minimum of 242 calendar days in a typical year. As a result, closed-loop conversion of PNPS represents a technologically infeasible CW cooling technology.
Upgraded Fish Return Trough	The existing sluiceway is designed to optimize survival, which is limited due to the fragility of impinged species. Therefore, while an upgraded fish return trough is technologically feasible, no significant decrease in impingement mortality is expected.
Coarse Mesh Ristroph Screens	Retrofit to coarse mesh ristroph screens is technologically feasible. However, due to the fragility of impinged species, no significant decrease in impingement mortality is expected.
Fine Mesh Ristroph Screens	Retrofit to fine mesh ristroph screens is technologically infeasible due to nuclear safety concerns associated with increased potential for plant shutdowns. Additionally, implementation requires extensive expansion of the CWIS.
Dual-Flow Conversion Traveling Screens	Retrofit to dual-flow conversion traveling screens is technologically feasible but yields increased through-screen velocity absent CWIS redesign. Additionally, due to the fragility of impinged species, no significant decrease in impingement mortality is expected.
Multi-Disc Screens	Retrofit to multi-disc screens is technologically feasible. However, due to the fragility of impinged species, no significant decrease in impingement mortality is expected.
WIP Screens	Retrofit to WIP screens is technologically infeasible because such a retrofit is unproven at domestic nuclear facilities. Additionally, due to the fragility of impinged species, no significant decrease in impingement mortality is expected.
Angled Traveling Screens and Modular Inclined Screens	Retrofit to angled traveling screens or modular inclined screens is technologically infeasible because such a retrofit is unproven at nuclear facilities. Such a retrofit would require complete redesign of the CWIS. Finally, due to the fragility of impinged species, no significant decrease in impingement mortality is expected.
Fish Net Barriers	Use of fish net barriers is technologically infeasible due to nuclear safety concerns associated with possible entanglement and reduced flow to safety-related SSW pumps.

### Table 14      Summary of Alternatives

Technology or Operational Measure	Evaluation Conclusions
Cylindrical Wedgewire Screens	Retrofit to cylindrical wedgewire screens is technologically infeasible due to nuclear safety concerns associated with clogging of the intake. Requires redesign of CWIS to isolate SSW from CW, requiring modification to the Station's operating license.
Aquatic Microfiltration Barriers	Use of aquatic microfiltration barriers is technologically infeasible due to nuclear safety concerns associated with possible entanglement and reduced flow to safety-related SSW pumps.
Behavioral Barriers	An acoustic fish deterrence system is potentially technologically feasible, but requires further study to fully assess biological effectiveness and engineering feasibility.
Alternative Intake Location	Retrofit to an alternative intake location is potentially technologically feasible, but additional study is required because PNPS site-specific biological information does not provide the optimal location or depth for an offshore intake.
Variable Speed Pumps (VSPs)	<p>VSPs are technologically feasible for I&amp;E reduction, but would require a substantial increase in temperatures of the PNPS thermal discharge.</p> <p>Equivalent adult entrainment:      28.9% annual reduction at 0% active power loss  42.1% annual reduction at 20% active power loss</p> <p>Equivalent adult impingement:      27.5% annual reduction at 0% active power loss  40.8% annual reduction at 20% active power loss</p> <p>Estimated capital costs of approximately \$7 million.</p>
Assisted Recirculation	Retrofit to assisted recirculation is potentially technologically feasible, with theoretical performance similar to that of VSPs, but at a minimum speculative cost more than fifty times greater. Additional study is required to fully assess technological feasibility, biological effectiveness, and costs of postulated design.
Grey Water	Use of grey water is technologically infeasible due to limited sources of grey water in the vicinity of PNPS.



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Mr. Damien Houlihan  
U.S. Environmental Protection Agency  
One Congress Street  
Suite 1100 (Mail Code CIP)  
Boston, MA 02114-2023

**Re: Entergy Nuclear Generation Company  
Pilgrim Nuclear Power Station National Pollutant Discharge Elimination System  
("NPDES") Permit No. MA0003557  
Response to Information Request in support of NPDES Permit Reissuance**

Dear Mr. Houlihan:

On behalf of Entergy Nuclear Generation Company ("Entergy"), enclosed please find two copies each (in hard and electronic format) of four (4) separate reports (the "Reports") that, in conjunction with this correspondence and the affidavits referenced herein, collectively constitute Entergy's response to the July 31, 2007 request from the United States Environmental Protection Agency ("EPA") under §308 of the Clean Water Act (the "CWA" or the "Act") (the "§308 Letter") regarding Entergy's Pilgrim Nuclear Power Station ("PNPS" or the "Station") in Plymouth, Massachusetts. We appreciate that, at Entergy's request, EPA set the date for Entergy's response to July 7, 2008.

**I. BACKGROUND**

PNPS' cooling water intake structure ("CWIS") was constructed in the 1970's and has been modified over the last three decades to reflect the best technology available ("BTA") for minimizing adverse environmental impact under §316(b). The CWIS has been modified based on comprehensive studies performed by Entergy (and its predecessors), but designed and approved by EPA, the Massachusetts Department of Environmental Protection ("DEP") and the Pilgrim Administrative Technical Committee ("PATC"), a committee created with representatives from EPA, DEP, the Massachusetts Division of Marine Fisheries, the Massachusetts Coastal Zone Management Program Office and the National Marine Fisheries Services, historically to "ensure the Pilgrim marine studies have the benefit of qualified, outside,



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scientific and technical advice and are responsive to regulatory concerns.”<sup>1</sup> Based on the PATC’s findings, EPA (with DEP’s concurrence) has renewed each of PNPS’ NPDES permits over this thirty-year period, consistently determining and, as of the Station’s recent NPDES permits, expressly stating that PNPS’ existing CWIS configuration already constitutes BTA under §316(b). *See, e.g.*, PNPS NPDES Permit, §A.1.i, at 3 (“It has been determined, based on engineering judgment, that the circulating water intake structure presently employs the best technology available for minimizing adverse environmental impact ... The present design shall be reviewed for conformity to regulations pursuant to Section 316(b) of the Act when such are promulgated.”).

While PNPS’ current NPDES permit dates to 1994, in part owing to DEP watershed initiatives, in response to serial §308 letters from EPA (in 1999 and 2000), in 2000, PNPS submitted an updated §316(b) demonstration that concluded, based on the then approximately 25 years of environmental monitoring data collected since EPA’s 1977 approval of PNPS’ 1975 §316(b) demonstration, that operation of PNPS’ CWIS had not resulted, and was not expected to result, in an adverse environmental impact to the aquatic ecosystem in the vicinity of the Station as a result of impingement or entrainment (“AEI”). Moreover, in conjunction with its promulgation of the 2004 regulations implementing §316(b) at existing large-scale steam-electric generating facilities (the “Rule”), EPA performed a detailed facility-specific assessment of PNPS, concluding that no additional CWIS technology is required to bring PNPS into compliance with §316(b), and published that result in the Rule. *See* 69 Fed. Reg. 41576, 41646, 41677 (Jul. 9, 2004) (PNPS is among facilities that “already meet otherwise applicable performance standards based on existing technologies and measures” and for which EPA “projected zero compliance costs” under §316(b)); *see also* 68 Fed. Reg. 13522, 13567 and n.23 (Mar. 19, 2003); *Case Study Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule* (EPA-821-R-02-002), Part G: Seabrook and Pilgrim Facilities Case Study (Feb. 2002); 40 C.F.R. §125.95(b)(6); 69 Fed. Reg. 41646, 41677. Thus, the assessments performed by PNPS and EPA support PNPS’ NPDES Permit provision reflecting that operation of PNPS’ CWIS has not resulted in an AEI, and expressly stating that PNPS’ CWIS currently complies with §316(b) and comparable state law, if any.<sup>2</sup>

<sup>1</sup> *See, e.g.*, August 30, 1994 Modification of Authorization to Discharge Under the National Pollutant Discharge Elimination System, Federal Permit No. MA0003557 (“PNPS Permit”), Attachment A (Attachment to BECo Letter No. 90-068 dated December 21, 1990, “Marine Ecology Monitoring Related to Operation of Pilgrim Station Unit 1 NPDES Permit Programs”), I.A.; *see also* PNPS Permit, §A.8.d (PNPS “shall carry out the monitoring program under the guidance of the Pilgrim Technical Advisory Committee”). The PATC, also known as the Pilgrim Technical Advisory Committee, met almost a hundred times from 1969 through 2000.

<sup>2</sup> In 2007, Entergy challenged an amendment to the Massachusetts water quality standards (“WQS”), 314 CMR 4.00, purporting to authorize DEP to regulate CWIS in a manner comparable to §316(b), *see Entergy Nuclear Generation Company v. Massachusetts Department of Environmental Protection*, Suffolk Superior Court, Civil Docket No. SUCV2007-00366-H, on the grounds that, *inter alia*, Massachusetts law provides no such independent authority. That action remains pending.



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As detailed below, the Reports collectively present an analysis that confirms, despite evolving law and precedent, PNPS' 2000 §316(b) demonstration. The Reports below also confirm EPA's twin conclusions, including in the site-specific case study it performed for PNPS in the Rule, that: (1) there is no AEI reasonably attributable to PNPS' CWIS, and (2) the current configuration and operation of PNPS' CWIS already satisfy §316(b).

Based on this analysis and EPA's conclusions to date, Entergy believes no CWIS technology retrofit is required or authorized under §316(b) to minimize AEI at PNPS. While impingement and entrainment mortality ("I&E") at PNPS are not of a magnitude to constitute an AEI under §316(b), Entergy proposes to assess, voluntarily during PNPS' renewed permit term, two potentially applicable technologies, one primarily applicable to impingement, the other primarily applicable to entrainment. Entergy makes this proposal not in order to respond to an AEI that Entergy's consultants have concluded does not exist, but in order to respond cooperatively to EPA's generalized concern regarding I&E nationwide and to begin collecting specific data regarding PNPS that could be useful in the Station's ongoing response to evolving EPA §316(b) regulations. Thus, Entergy is proposing to discuss with EPA the following studies:

- *Acoustic fish deterrent system (impingement)*: Upgraded screening technologies will not effectively further reduce the impingement mortality of Atlantic menhaden, the fish species that dominates impingement at PNPS, because of that species' fragility. Instead, Entergy proposes to discuss, with EPA, a targeted research and development plan to evaluate the technological feasibility and potential biological effectiveness of an acoustic fish deterrent system aimed at reducing Atlantic menhaden impingement. The assessment would need to focus on such a system's: (1) technological feasibility, given the exposed location of PNPS' CWIS, and (2) biological effectiveness for Atlantic menhaden. Entergy's successful use of acoustic and visual behavioral barriers at its J.A. FitzPatrick Station in Oswego, New York for a related species suggests biological effectiveness may be confirmed.
- *Offshore intake location (entrainment)*: Insufficient data currently exists to assess the feasibility or effectiveness of an offshore intake location, both in terms of identifying the potential location of an offshore intake and whether that location will reduce (or exacerbate) entrainment. Accordingly, Entergy proposes to discuss, with EPA, a targeted study plan to: (1) assess the marine environment with respect to possible locations for an offshore intake structure that could reasonably be expected to reduce entrainment and (2), if warranted, perform an engineering evaluation of the design and cost of such a system.

Despite current data limitations, adequate information exists to support preliminary (*i.e.*, bounding) analyses of the costs and benefits of these respective technologies, and these analyses



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are included in appendices to the Economic Impact Report (defined below). The bounding analyses indicate that neither technology is expected to lead to benefits that exceed costs, and therefore neither would be considered BTA under any reasonable economic measure. Nonetheless, consistent with its commitment to exceed certain environmental standards, Entergy remains willing to discuss with EPA the development of study plans to assess an acoustic deterrent system and an offshore intake location.

Finally, Entergy appreciates that this submission includes extensive information, including with respect to considerations beyond EPA's expertise, e.g., nuclear safety, and implicates matters that are in a state of flux, particularly owing to the United States Supreme Court's pending review of *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2nd Cir. 2007), cert. granted sub nom. *Entergy v. Riverkeeper*, 128 S. Ct. 1867 (2008) ("*Riverkeeper II*"). As such, Entergy would like to establish, and hereby requests, a schedule for conducting meetings, including among available representatives of Entergy's consulting team and EPA staff persons, to ensure: (1) appropriate discussion of this submission, including the proposed biological, engineering and economic studies summarized below; and (2) a decision grounded in substantial evidence that reduces the risk and cost to Entergy and EPA alike of a contested proceeding.

## II. OVERVIEW OF SUBMISSION

The §308 Letter specifically requests that PNPS submit a "CWIS Information Document" that: (1) "characterize[s] impingement, impingement-induced mortality and entrainment" by PNPS' existing CWIS; (2) "describes the operation" of the CWIS; (3) "evaluate[s] both the existing technologies and operational measures, as well as possible additional technologies and operational measures, as potential components of the BTA under §316(b)"; and (4) "establish[es] whether the technologies and/or operational measures already installed, or that the Station proposes to install, reflect the BTA under CWA §316(b)." The Reports respond to and satisfy these requests.

While the Reports speak for themselves, we would like to outline the conclusions of each Report, as follows:

- The first report, *Adverse Environmental Impact Assessment for Pilgrim Nuclear Power Station* (June 2008) (the "AEI Report"), prepared by leading fisheries scientist Dr. Lawrence Barnhouse, as well as Drs. Mark Mattson and Mike Scherer of Normandeau Associates, Inc. ("Normandeau"), and reviewed by Dr. Douglas Heimbuch, assesses the potential adverse impacts of PNPS' CWIS on the relevant aquatic species in proximity to PNPS. The AEI Report uses a biologically-based definition of the term adverse environmental impact that reflects established standards of ecological risk assessment and fisheries management; thus, the methodology it employs is both settled and accepted by EPA and others charged with resources assessment. The AEI Report assesses, among



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other data, I&E data collected annually at PNPS since 1980, near-field fisheries monitoring studies for important species susceptible to I&E at PNPS, and regional and coastal fisheries data available from state and federal resource-management agencies (i.e., conservative, independent abundance estimates). Thus, the AEI Report dataset is extensive and is frequently from independent sources. On the basis of this analysis, grounded in a sound methodology and robust dataset, the AEI Report concludes that the available evidence indicates that the operation of PNPS' CWIS has not impacted early life stages of fish, or the attendant populations, in a manner that reasonably would be considered "adverse" by fisheries scientists or managers.

- The second report, *Engineering Response to United States Environmental Protection Agency CWA § 308 Letter – Pilgrim Nuclear Power Station, Plymouth, Massachusetts* (June 2008) (the "Technology Report"), prepared by leading nuclear engineering firm Enercon Services, Inc. ("Enercon"), with input from Normandeau and NERA Economic Consulting, Inc. ("NERA"), assumes (contrary to fact) that some level of AEI does exist in conjunction with operation of PNPS' existing CWIS. Based on this assumption, the Technology Report evaluates, in terms of technological feasibility (including nuclear safety)<sup>3</sup>, several CWIS technologies generally expected to reduce I&E, the assessment of which is requested in the §308 Letter or consideration of which is otherwise warranted in Enercon's professional judgment.<sup>4</sup>

<sup>3</sup> Nuclear safety considerations arise in the Rule and as a matter of federal law. See, e.g., 40 C.F.R. §125.94(f) (not remanded in *Riverkeeper II*); see also 42 U.S.C. §2201(i)(3) (authorizing Nuclear Regulatory Commission ("NRC") to "prescribe such regulations or orders as it may deem necessary ... to govern any activity authorized pursuant to this [Atomic Energy] Act, including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property"); *Pacific Gas & Elec. Co. v. State Energy Resources Conservation & Dev. Comm.*, 461 U.S. 190, 207 (1983) (NRC maintains "complete control of the safety and 'nuclear' aspects of energy generation"); *Train v. Colorado Public Interest Research Group, Inc.*, 96 S.Ct. 1938, 1945 (1976) ("The thrust of Senator Muskie's assurances that the FWPCA would not 'in any way affect' the regulatory powers of the AEC was, we think, that the AEC was to retain full authority to regulate the materials covered by the AEA, unaltered by the exercise of regulatory authority by any agency under the FWPCA.").

<sup>4</sup> Consistent with EPA's definition of "cooling water intake structure" in the Rule, and as shown in Appendix 1, "Drawings with Plan and Sectional Views of Intake Structure," of PNPS' Proposal for Information Collection (Energy/Enercon/Normandeau 2006), the CWIS at PNPS begins with a constructed intake embayment created by two large breakwaters, includes a skimmer wall and vertical barracks, vertical traveling screens cleaned by dual-level spray washing and employing screen fins and a fish return system upstream of the point of entry, and terminates with the circulating water pumps. See 40 C.F.R. §125.93 ("Cooling water intake structure means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps."); see also 69 Fed. Reg. at 41580 ("Inclusion of the term 'associated constructed waterways' in today's rule is intended to clarify that the definition [of 'CWIS'] includes those canals, channels, connecting waterways, and similar structures that may be built or modified to facilitate the withdrawal of cooling water.").



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Briefly, the Technology Report concludes that retrofitting PNPS with most of the CWIS technologies typically identified as potentially reducing I&E, including closed-cycle cooling, is not technologically feasible, frequently as a matter of nuclear safety. Of the technologies evaluated, Enercon determined that four (4) are potentially technologically feasible: (1) variable speed pumps operating under substantially higher thermal discharge limits<sup>5</sup>; (2) a fish deterrence system; (3) relocation of the CWIS to an offshore location; and (4) installation of "assisted recirculation." The Technology Report provides a preliminary cost assessment based on sound engineering judgment, though not reflecting all site-specific costs likely to be incurred, for variable speed pumps and assisted recirculation. However, assisted recirculation is unprecedented, and therefore its technological feasibility determination is, as Enercon states, theoretical at this time, and its cost assessment is correspondingly likely to be highly understated. Finally, since the fish deterrence system and offshore intake require further evaluation to establish their biological and engineering feasibility at PNPS, no detailed cost assessment of either technology is provided; rather, only bounding analyses are provided.

- Likewise assuming (again, contrary to fact) an AEI attributable to PNPS' existing CWIS, the third report, *Economic Assessment of Fish Protection Alternatives at Pilgrim Nuclear Power Station* (June 2008) (the "Economic Impact Report"), prepared by leading economists at NERA with input from Enercon and Normandeau, considers the ramifications of retrofitting PNPS with the technologies that Enercon determined to be technologically feasible for implementation at PNPS. See, e.g., 40 C.F.R. §125.94(a)(5)(ii) ("If the Director determines that data specific to your facility demonstrate that the costs of compliance under alternatives in paragraphs (a)(2) through (4) of this section would be significantly greater than the benefits of complying with the applicable performance standards at your facility, the Director must make a site-specific determination of best technology available for minimizing adverse environmental impact."). Briefly, the Economic Impact Report concludes that neither retrofitting PNPS with variable speed pumps, nor employing the unprecedented assisted recirculation system, is appropriate under any reasonable economic measure.

Significantly, since issuance of the Rule, a shift in environmental priorities has occurred nationwide, with Climate Change increasingly playing a lead role in our national discussion of potential environmental risks and rewards. In light of this important national trend and consistent with applicable law, the Economic Impact Report evaluates

<sup>5</sup> Entergy expects that the thermal limits identified in the Technology Report may require a §316(a) demonstration, or in any event that EPA may request such a demonstration to inform its assessment of variable speed pumps. This is one of the several questions underpinning Entergy's request for appropriate conferences regarding PNPS and EPA's assessment.



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the significant adverse energy and non-aquatic environmental impacts, including Climate Change considerations, of loss of output from retrofitting CWIS at PNPS and comparable nuclear facilities. *See, e.g.,* 33 U.S.C. §§ 1311(b)(2) and 1314(b); *Riverkeeper II*, 475 F.3d at 105 ("EPA could rely on factors other than I&E in establishing BTA, such as negative environmental impacts or concerns about energy production and efficiency."). The Report finds substantial risk not only of disruption to regional electric-system function, but also of significant increases in air emissions, particularly of carbon dioxide implicating Climate Change considerations. For instance, in comparing different potential utilizations of variable speed pumps at PNPS, the Economic Impact Report finds that every additional *pound* of fish theoretically resulting from the retrofitting with variable speed pumps would lead, on average, to substantial additional carbon dioxide emissions from replacement power of 23 metric *tons*. This amounts to millions of tons of additional carbon dioxide emissions over the remaining station life. In short, EPA's decisionmaking here must account for the reality that, absent a credible finding of AEI (not in evidence here), a retrofit decision could exacerbate emissions and presumptively Climate Change impacts. These air and energy-related impacts are substantially exacerbated if premature shutdown occurred at PNPS and comparable nuclear units result. Closure of PNPS, given its significance in the New England electricity grid, would substantially decrease reliability and increase electricity prices. Premature shutdown of all New England nuclear units results in negative capacity margins, virtually guaranteeing compromised electric-system function. In short, as the Economic Impact Report underscores, absent affirming PNPS' existing CWIS technologies and operational measures, EPA's decisionmaking involves – at best – substantial environmental trade offs.

Lastly, the Economic Impact Report contains a detailed assessment of EPA's site-specific analysis of PNPS, underscoring how this Report is consistent with EPA's site-specific findings in promulgating the Rule.

- The fourth report, *Entrainment and Impingement Studies Performed at Pilgrim Nuclear Power Station, Plymouth, Massachusetts from 2002 to 2007* (June 2008) (the "E&I Sampling Report"), also prepared by Normandeau, focuses on Request Nos. 6 and 7 in the Technology and Biological Assessment Information section of the §308 Letter's Attachment A, providing responses to those Requests and additional relevant biological information.

In establishing projected flows in the Technology Report and the E&I Sampling Report, Enercon and Normandeau respectively have relied upon the licensed design flow information, as provided in PNPS' Final (Nuclear) Safety Analysis Report ("FSAR"), of 155,500 gallons per minute ("gpm") at a representative rated head of 27.5 feet for each circulating water pump (447.84



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million gallons per day ("MGD") combined), and the design flow for the five (5) service water pumps of 13,500 gpm (19.44 MGD, combined), with an aggregate value of 324,500 gpm (467.28 MGD). This licensed design flow corresponds to the "design intake flow" for PNPS, as that term has been defined in the Rule. *See, e.g.*, 40 C.F.R. §125.93 ("the value assigned (during the cooling water intake structure design) to the total volume of water withdrawn from a source waterbody over a specific time period"); *see also Matter of Riverkeeper v. Johnson*, 2008 NY Slip Op. 05608, at 4 (N.Y. App.Div. 3d Jun. 19, 2008) (affirming use of "full-flow" baseline for evaluating reductions in I&E). That said, flow variability can and does occur as a function of numerous ambient and plant-related factors, *e.g.*, condenser function, pump usage, outages and tidal conditions. As such, actual flow may, and often does, vary from the provided licensed design flow value. In addition, because the AEI Report reflects actual historical I&E conditions, Normandeau has used alternative flow information more representative of actual flows over the period analyzed, although even that flow information is conservative (*i.e.*, overstates the historically experienced flows at PNPS). Likewise, in the Economic Impact Report, NERA relies on this alternative flow information.

Lastly, we understand that PNPS personnel have communicated to EPA personnel a request (reiterated here) to correct the flow-calculation information in PNPS' existing NPDES permit, both to ensure that: (1) the distinction between average and daily maximum flow limits is clear in the renewed NPDES permit, contrary to what the current NPDES Permit Fact Sheet suggests ("The Station's circulating water system provides once through cooling water using approximately 510 MGD of marine water from Cape Cod Bay"); and (2) the PNPS formula for calculating average flow, including as it relates to discharge monitoring reports ("DMRs"), be revised to reflect a flow rate of 155,500 gpm for each circulating water pump, consistent with the current licensed design (or design intake) flow of PNPS described in the Technology Report. We appreciate that the DMRs require only that PNPS "estimate" pump capacity, and that the incremental change from 155,000 to 155,500 is *de minimis* (*i.e.*, 0.32%), but we nonetheless would appreciate consistency in the Nuclear Regulatory Commission ("NRC")-issued license and EPA-issued NPDES Permit that this requested change would afford.

Each of the Reports is accompanied by an affidavit from its principal authors describing their expertise in their respective fields.

### III. DISCUSSION OF CERTAIN RELEVANT CONSIDERATIONS

#### A. No AEI Reasonably Attributable to PNPS' CWIS Exists.

In the context of EPA's determination under §316(b) and comparable state law, if any, EPA must identify AEI reasonably attributable to PNPS' CWIS. As detailed below, however, the Fisheries Report concludes that no AEI reasonably is attributable to PNPS' CWIS.



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Moreover – the §308 Letter notwithstanding – EPA is already in agreement that there is no AEI reasonably attributable to PNPS' existing CWIS, having issued a legal determination – promulgated in Appendix A of the Rule, not remanded in *Riverkeeper II* – that PNPS does not need to incur any costs to comply with CWA §316(b). See 40 C.F.R. §125.95(b)(6); 69 Fed. Reg. 41644-41647, 41677 (EPA determination in Appendix A to the Rule that PNPS' total calculated costs for complying with the Rule are zero). EPA made this express determination after performing an extensive facility-specific assessment of PNPS' CWIS as part of its development of the Rule, thus confirming that EPA's regulatory conclusion is supported by technical analysis. See, e.g. 68 Fed. Reg. 13522, 13567 and n.23 (Mar. 19, 2003) (EPA evaluated “five estuary/tidal river and ocean case study facilities,” including PNPS, “for the section 316(b) Rule proposal (See Appendix 4 of Estimating Total and Nonuse Values for Fish, Based on Habitat Values for Coastal Wetlands and Eelgrass (SAV) DCN 5-1010.”); *Case Study Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule* (EPA-821-R-02-002, Feb. 2002), Part G: Seabrook and Pilgrim Facilities Case Study (comprehensive evaluation of PNPS and Seabrook in support of proposed Rule).

1. AEI Is a Threshold Determination.

CWA §316(b), which requires that “the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact,” and comparable state law, if any, create – as a trigger for their application – the credible existence of AEI, absent which there is no need to determine whether a plant's CWIS constitutes BTA and EPA's action would be unreasonable. See 33 U.S.C. §1326(b) (requiring minimization of AEI); 40 C.F.R. §125.90(a) (providing that purpose of Rule is to minimize AEI); 69 Fed. Reg. at 41583 (“the object of the ‘best technology available’ is explicitly articulated by reference to the receiving water: To minimize adverse environmental impact in the waters from which cooling water is withdrawn”); see also *Matter of Athens Generating Co., LP, Interim Decision of the Commissioner*, DEC No. 4-1922-00055/00001, SPDES No. NY-0261009, 2000 N.Y. Env. Lexis 49, at \*17-\*18 (NY DEC Jun. 2, 2000) (first prong of analysis under 6 NYCRR §704.5, a state provision mirroring §316(b), is “whether the facility's cooling water intake structure may result in adverse environmental impact”). In the Rule, EPA assumed AEI at the national level, but expressly contemplated, and allowed, site-specific assessment in individual permitting contexts. See, e.g., 69 Fed. Reg. at 41604 (“While EPA believes that there is considerable value in promulgating national performance standards under section 316(b) based on what EPA determines, on a national basis, to be the best technology available to minimize adverse environmental impacts, EPA also recognizes that, at times, determining what is necessary to minimize adverse environmental impacts can necessitate a site-specific inquiry.”); see also 69 Fed. Reg. at 41620 (“today's final rule does allow facilities to use the results of a well-constructed, sites-specific entrainment survival study, approved by the Director, in their benefits assessments when seeking site-specific entrainment requirements”); see also *Matter of Riverkeeper v. Johnson*, 2008 NY Slip Op. 05608, at 4-5 (N.Y. App. Div. 3d



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Jun. 19, 2008) (affirming agency consideration of entrainment survival data in assessing environmental impacts under §316(b) and state analogue).

In short, AEI is a threshold determination that reasonably must be made before any other issues are reached.

## 2. AEI Determinations Should Focus on Population-Level Impacts.

On a site-specific basis, an AEI determination must be grounded in a population-level analysis to be consistent with established standards of ecological risk assessment and fisheries management, as well as EPA's own guidance and precedent. *See, e.g.*, AEI Report. For example, the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act") -- also known as the Sustainable Fisheries Act -- views fish populations as renewable resources for which mortality (in the form of commercial and recreational harvesting) is not only permissible, but encouraged up to the point at which it threatens long-term productivity of the population. *See, e.g.*, 16 U.S.C. §1801(a)(5) ("If placed under sound management before over-fishing has caused irreversible effects, the fisheries can be conserved and maintained so as to provide *optimal yields on a continuing basis.*") ("Findings, purposes and policy") (emphasis supplied); 50 C.F.R. §600.310 ("Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the [optimum yield] from each fishery for the U.S. fishing industry") (National Standard 1 -- Optimum Yield regulation promulgated under Magnuson-Stevens Act) (emphasis supplied); *see also* 16 U.S.C. §1851(a)(3) ("To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and *interrelated stocks of fish shall be managed as a unit* or in close coordination.") (emphasis supplied). Thus, a tenet of federal fisheries law, one that necessarily informs resource assessment by EPA under §316(b), is that mortality is acceptable (and in the context of commercial and recreational fishing, encouraged), absent a measurable population-level impact.

EPA's *Guidelines for Ecological Risk Assessment* (the "Guidelines"), which were issued to provide criteria for evaluating whether observed or predicted changes should be considered "adverse," and which apply expressly to the "management of *watersheds or other ecosystems* affected by multiple nonchemical and chemical stressors," also target population-level impacts. *See Guidelines for Ecological Risk Assessment*, EPA/630/R-95/002F at 8 (April 1998) (emphasis supplied). According to the Guidelines, adverse ecological effects are changes that "alter valued structural or functional attributes of the *ecological entities* under consideration." *Id.* at B-1 (emphasis supplied). The Guidelines define "ecological entity" as "*a species, a group of species, an ecosystem function or characteristic, or a specific habitat.*" *See id.* (emphasis supplied). In other words, except in the case of species for which protection of individual organisms is



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mandated by statute (e.g., endangered species)<sup>6</sup>, EPA's own Guidelines for Ecological Risk Assessment direct the performance of population-level analysis in ecosystem, including oceanic, management. Likewise, EPA's own precedent is that, in assessing AEI, populations and communities, not individual fish, are the proper focus. See, e.g., *In re Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 3)*, Final Decision, NPDES Appeal No. 76-7, 1977 EPA App. LEXIS 16, at \*62 (EPA June 10, 1977) ("*Seabrook*") (entrainment of 4.6% of *Mya* larvae would have an insignificant effect on adult *Mya* populations, thus underscoring that cropping of early life stages, of itself, is not an AEI, and that something more is needed to trigger application of BTA under §316(b)).<sup>7</sup> In short, the AEI Report provides a sound and scientifically appropriate basis for defining AEI as consisting of adverse changes in important population characteristics sufficient to threaten the sustainability of susceptible populations.

### 3. No AEI Reasonably Attributable to PNPS' CWIS Exists.

Consistent with these definitions of AEI, the AEI Report evaluates three decades of PNPS-specific I&E information (collected under EPA, DEP and PATC direction and approval) to determine whether operation of PNPS' CWIS reasonably can be considered to have caused an AEI. More specifically, the AEI Report examines whether I&E imposes sufficient additional mortality, either alone or in combination with other sources of mortality such as commercial or recreational harvesting, to threaten the ability of these populations to sustain themselves or perform their normal ecological functions. The AEI Report considers, *inter alia*, the following lines of evidence: (1) equivalent adult losses of all considered species compared against conservative, independent estimates of the abundance of local and regional populations; (2) the percent of the larval flux of winter flounder past PNPS that is entrained, as determined by larval transport studies; (3) patterns of recruitment of cunner larvae to rocky habitats in the vicinity of PNPS; and (4) estimates of the impacts of I&E on the ability of winter flounder and Atlantic

<sup>6</sup> According to EPA's *Generic Ecological Endpoints (GEEs) for Ecological Risk Assessment*, EPA/630/P-02/004F at 13, these species include endangered and threatened species listed by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service as in danger of extinction under the Endangered Species Act, marine mammals protected by the Marine Mammal Protection Act, bald eagles and golden eagles protected by the Bald Eagle Protection Act, and U.S. birds protected by the Migratory Bird Treaty Act.

<sup>7</sup> Seabrook was a new facility at the time of the EPA Administrator's decision, and therefore presumptively subject to the traditionally more stringent requirements applied to new facilities. See 66 Fed. Reg. 65256, 65273 (Dec. 18, 2001) (Phase I regulations impose two-track system under which all new facilities with CWISs with design intake flow equal to or greater than 10 MGD must "reduce your intake flow, at a minimum, to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system" and "design and construct each cooling water intake structure at your facility to a maximum through-screen design intake velocity of 0.5 ft/s," or demonstrate to EPA or state "that the technologies employed will reduce the level of [AEI] from your [CWISs] to a comparable level to that which you would achieve were you to implement the requirements of paragraphs (b)(1) and (2) of this section.") (emphasis supplied).



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menhaden stocks to support harvesting at target rates established by federal and state fisheries managers.

The AEI Report concludes that the operation of PNPS' CWIS has not caused impacts on any relevant life stage of fish, or the attendant populations, that reasonably would be considered "adverse" by fisheries scientists or managers.<sup>8</sup> The AEI Report, thus, confirms a three-decade record of biological monitoring and assessment that has never identified AEI, nor resulted in an EPA (or DEP) finding to that effect. *See, e.g.*, 40 C.F.R. §125.95(b)(6); 69 Fed. Reg. at 41644-41647.<sup>9</sup> Moreover, the authors of the AEI Report are among the nation's leading fisheries scientists. Dr. Barnthouse, a member of the Atlantic States Marine Fisheries Commission ("ASMFC") Power Plant Panel, and Chair of the Society of Environmental Toxicology and Chemistry's Population-Level Ecological Risk Assessment Work Group, has 30 years of experience in research and assessment projects involving impacts of energy technologies in freshwater, estuarine and marine environments, much of it on behalf of EPA. Dr. Heimbuch, likewise a member of the ASMFC Power Plant Panel, has designed statistically rigorous, peer-reviewed, large-scale fish sampling programs and associated data analysis methods for federal and state agencies, including work for EPA in developing and implementing methods for analyzing data from coast-wide estuarine fish sampling programs (Heimbuch, et al. 1998), and for ASMFC to develop methods for assessing coast-wide effects of I&E on fish populations (Heimbuch, et al. 2007). The views of these experts, well versed in EPA methodologies and the frequent consultants of choice for EPA on these issues, are entitled to particular weight.

**B. PNPS' Existing CWIS Configuration and Operational Measures Satisfy CWA §316(b) and Comparable State Law, if Any.**

Even though the AEI Report, backed by EPA's own determination in the Rule itself, concludes that no AEI reasonably is attributable to PNPS' CWIS, the Technology Report – at EPA's direction – evaluates the customary range of CWIS technologies, such as closed-cycle cooling, variable speed pumps, relocation of the existing intake to an offshore location, screening and flow reduction technologies, to determine whether any of these technologies could reasonably be installed at PNPS with a goal of reducing I&E, *e.g.*, is "available" as that term is used in §316(b). Assuming, as a first measure, general availability of a technology on which EPA has requested analysis, the second measure of "availability" is a qualified engineering assessment that a

<sup>8</sup> Entrainment typically implicates early life stages (*i.e.*, eggs and larva) of aquatic species. Impingement typically implicates juveniles and in comparatively rare circumstances adult fish and shellfish.

<sup>9</sup> Survival of certain relevant species is significant, *e.g.*, 49% and 84% of age-1 equivalents for winter flounder and cunner, respectively. The AEI Report, however, includes analyses that, for all species other than winter flounder, conservatively assumes zero survival despite data to the contrary. In addition, the Economic Impact Report undertakes a sensitivity analysis reflecting zero survival, demonstrating that the Report's results do not change even if, contrary to fact, zero survival is assumed to occur.



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technology in question is technically feasible at a specific site, here PNPS. As discussed below, the Technology Report concludes that few, if any, of the customary range of technologies are technologically feasible at PNPS. Even if technologically feasible on a site-specific basis, equipment must be otherwise "available" under §316(b), requiring consideration of its commercial availability. As discussed in the Technology Report and below, the additional technologies available to PNPS at this time are limited to variable speed pumps when operated under substantially revised thermal discharge limitations, *i.e.*, allowing increased thermal discharge to Cape Cod Bay. In addition, an available technology must be legal, that is within EPA's jurisdiction to require. At nuclear facilities, such as PNPS, legality is premised on nuclear safety, but also implicates a host of other laws, *e.g.*, local zoning, state authorizations and jurisdictional tenets, such as EPA's limited authority to mandate certain site-related changes.

1. A Technology Must Be "Available" Under CWA §316(b).

To be considered "available" under §316(b) and comparable state law, if any, technologies must be: (1) "technologically feasible," both in general and in a site-specific manner, as determined by a qualified engineer, here Enercon; and (2) commercially available or preceded, *e.g.*, demonstrated through in-place functioning examples at reasonably comparable facilities, irrespective of potential technological feasibility; in addition, a technology must be legal or within the jurisdiction of EPA to require, *e.g.*, able to be located without mandating the acquisition of additional property. *See, e.g., Dominion Energy Brayton Point LLC, NPDES 03-02*, EPA Environmental Appeals Board, Remand Order (February 1, 2006) ("*Brayton Point Decision*"), at 221 n.268 ("[I]n deciding what technologies are 'available' – as EPA has interpreted that section 316(b) statutory term – the Agency considers whether a technology that might be either directly or indirectly required is 'technologically feasible'"); 69 Fed. Reg. 41576, 41602 (Jul. 9, 2004) ("[T]echnologies are 'technologically achievable' when they 'exist and are in use at various Phase II facilities,' and are 'commercially available' when 'facilities can and have installed [them] years after a facility began operation.'"); *Brayton Point Determination Document*, p. 7-9 ("[B]ecause each CWA §316(b) decision is made on a case-by-case basis, EPA must also consider whether any particular technology is truly feasible for use at BPS given the particular facts of the BPS situation. ... If it is not actually feasible at BPS, it would not be the 'best technology available' for BPS.") (emphasis in original); *Ethyl Corp. v. EPA*, 541 F.2d 1, 38 (D.C. Cir. 1976) ("Only rarely will a single study or example suffice, since by its nature scientific evidence is cumulative; the more supporting, albeit inconclusive evidence available, the more likely the accuracy of the conclusion."); *Brayton Point Decision*, at 285 ("[I]f a technology cannot legally be used ... this could render said technology 'unavailable'").

In other words, site-specific technological feasibility is a baseline determination for an available technology. However, the analysis is nuanced; a technology that is theoretically or generally feasible, but has never been demonstrated through operation at a comparable facility – that is, unprecedented technologies – may not reasonably be considered commercially available and, on



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that basis, available. Furthermore, however available, a technology beyond EPA's jurisdiction to order at a particular facility – that is, a technology that is not compatible with site constraints or that implicates nuclear-safety considerations at a NRC-licensed facility – is not legal.

## 2. Technologies Available at PNPS

In the Technology Report, Enercon determined that retrofitting PNPS with most of the customary range of CWIS technologies, including closed-cycle cooling, is not technologically feasible (including as a matter of nuclear safety) on a site-specific basis. Enercon also determined certain theoretical technologies were unprecedented. For those technologies that are determined to be technologically feasible at PNPS and not unprecedented, the Technology Report provides a preliminary (conceptual) cost assessment. As detailed below, the costs section of the Technology Report focuses on variable frequency drives, the addition of which would allow for variable speed pump operations, which were determined to be technologically feasible at PNPS when operated under substantially revised thermal discharge limitations (*i.e.*, allowing increased thermal discharge to Cape Cod Bay). For those potentially feasible, but unprecedented, technologies, Enercon performed a more limited cost assessment. Thus, a technology, titled “assisted recirculation” in the Technology Report, is conceptually technologically feasible, but unprecedented at any facility, let alone a nuclear facility; it, therefore, does not qualify as an “available” technology; Enercon performed a limited cost assessment for this technology.

Discussion of the closed-cycle cooling analysis bears particular mention, because it historically has been of interest to EPA. With respect to the site-specific technological feasibility of closed-cycle cooling, Enercon determined that PNPS was designed to operate, and currently operates, with a once-through cooling water system that draws cold salt water from Cape Cod Bay, circulates it through the Station circulating cooling water system's condenser to provide cooling, and discharges it back to Cape Cod Bay. This authorized cooling-system configuration, which is based on a large and generally stable temperature differential between the water entering and exiting the Station's condenser, means that PNPS has a designed, licensed, and approved condenser configuration reflective of that temperature dynamic. Through the use of state-of-the-art modeling to calculate the effects of a closed-loop configuration on PNPS, and comparison of those modeling results to the Station's absolute operational guidelines and standards, the Technology Report establishes that implementation of a closed-loop cooling water system at PNPS is not technologically feasible. In particular, as the Report indicates, conversion from the current once-through to closed-loop cooling would dramatically increase Station design parameters above several basic equipment limitations, and result in the degradation of the life expectancy of essential Station equipment, in a manner that contradicts absolute operational guidelines and standards. To ensure that equipment limitations would not be unsafely exceeded, the Station's net thermal load would have to be reduced to such an extent that nuclear safety concerns would render the Station completely inoperable for at least 242 calendar days in a



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typical year (based on historical ambient conditions). In short, evaluating the conversion of PNPS from once-through to closed-loop cooling at the §308 Letter's direction, the Technology Report concludes that converting PNPS to closed-loop cooling is technologically infeasible because it is inconsistent with the licensed operation of PNPS' approved condenser/turbine configuration. Moreover, the Technology Report records that retrofitting of nuclear facilities with closed-loop configurations is unprecedented generally. Thus, in addition to being technologically infeasible, closed-cycle cooling is not commercially available at PNPS. As such, closed-cycle cooling at PNPS doubly fails to satisfy the definition of an "available" technology.

Enercon likewise determined that the majority of screening and barrier systems designed for impingement reductions at PNPS are not technologically feasible or commercially available, as required by §316(b); they also may not be legal.<sup>10</sup> Thus, the technologies that Enercon reasonably could determine were technologically feasible, and that also satisfied the commercial availability aspect of the §316(b) standard, were limited to variable speed pumps operated at substantially increased thermal discharge limits. Enercon performed a cost assessment for this technology.

Two other potentially feasible technologies, which require further evaluation with respect to their potential application to PNPS before even preliminary cost assessments reasonably could be performed, deserve separate consideration: (1) fish deterrence systems; and (2) offshore intake structures. Installation and operation of an acoustic fish deterrent system, conceptually similar to the system presently employed at Entergy's J.A. FitzPatrick Station in New York, is generally technologically feasible, but requires further evaluation with respect to PNPS. The effectiveness of a fish deterrence system would be highly dependent on the species impinged at PNPS and their response to the deterrence mechanisms (e.g., sound), and on the technological feasibility of retrofitting the existing CWIS with ensonifying hardware that would be both appropriate for the task and tolerant of the harsh environmental conditions at PNPS. Thus, the Technology Report concludes that there is no basis for determining that a fish deterrence system would be

<sup>10</sup> Given the importance of uninterrupted cooling water flow to nuclear operations, there are nuclear safety concerns related to screening and barrier technologies and, to a lesser extent, mechanical flow reduction technologies. As noted in the Technology Report, NRC regulations and the mandatory guidance of the Institute of Nuclear Power Operations ("INPO"), the nuclear industry organization that sets performance objectives, criteria, and guidelines for plant operations and safety, impose certain requirements on "Intake Cooling Water Blockage," that do not allow the use of screen systems that may compromise the requisite flows to an ultimate heat sink or otherwise impair water-based nuclear-safety systems. These requirements are subject to revision in the near future because PNPS and other nuclear plants are currently preparing responses to a 2007 INPO "Significant Operating Experience Report" that requires evaluation of and implementation of measures to address all possible factors that could lead to Intake Cooling Water Blockage. This evaluation may result in future mandatory safety-related design changes to CWIS components that further complicate the installation of alternative screens, barriers, or mechanical flow reduction at PNPS above and beyond the technological feasibility considerations discussed in the Technology Report.



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biologically effective or technologically feasible on a site-specific basis at PNPS. However, based on Entergy's successful use of a comparable system at another facility, Entergy proposes the cooperative development of targeted biological and engineering studies during the renewed NPDES Permit term to evaluate the potential effectiveness of a fish deterrent system at reducing impingement of Atlantic menhaden, the most abundant fish species impinged at PNPS.

With respect to intake relocation offshore, there is currently insufficient biological data available either to identify and evaluate offshore intake locations or to assess the potential I&E benefits of an offshore intake, once located, relative to PNPS' existing intake. Moreover, Enercon's and NERA's bounding analyses of a mid-1970s proposal for an offshore intake location for the then-proposed (but never constructed) second PNPS unit suggests that relocating PNPS' existing intake is not likely to satisfy EPA's goals of reducing I&E at an acceptable cost. Nonetheless, Entergy again is willing to discuss additional biological studies needed to determine an offshore intake location, followed, if warranted, by an engineering evaluation of that location.

**C. The Costs of Retrofitting PNPS Are "Wholly Disproportionate" to the Environmental Benefits Provided and Otherwise Unwarranted.**

On April 14, 2007, the United States Supreme Court granted *certiorari* in *Entergy v. Riverkeeper, Inc.* on the question of whether EPA (and state regulators) may weigh costs and benefits in the course of regulating, pursuant to CWA §316(b) and comparable state law, if any, the CWISs used by existing power plants, including PNPS. The Court may reject the Second Circuit Court of Appeal's decision and reasoning in *Riverkeeper II*, reinstating the Rule's site-specific cost-benefit demonstration option. PNPS expects and would be entitled to rely on a cost-benefit analysis in any such circumstance. Given this state of flux in applicable law, Entergy respectfully requests that EPA await the Supreme Court's decision before finalizing any determination regarding what may constitute BTA at PNPS under §316(b). Awaiting the Supreme Court's decision also may reduce the risk of an EPA decision subject to litigation as inconsistent with intervening or applicable law, a situation exacerbated in Massachusetts where the "wholly disproportionate" test that the First Circuit Court of Appeals approved in *Seacoast Anti-Pollution League v. Costle*, 597 F.2d 306 (1st Cir. 1978) ("*Seacoast*") remains binding.

Nonetheless, the Economic Impact Report provides an assessment, performed in accordance with customary economic practice and EPA guidance, which compares the costs associated with retrofitting each of the EPA-identified CWIS technologies that Enercon has determined are technologically feasible at PNPS to the environmental benefits that would be obtained by such a retrofit, in terms of social cost. In each case, the Economic Impact Report concludes that the costs of retrofitting PNPS with any of the technologies that Enercon determined to be technologically feasible, or worth further investigation, exceed the environmental benefits that



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could be conferred by doing so by every reasonable measure.<sup>11</sup> NERA also considered the costs and benefits of assisted recirculation, despite the fact that use of such a technology is unprecedented and thus unavailable, likewise determining that its costs would greatly exceed its environmental benefits.<sup>12</sup>

Consistent with EPA's direction in the Rule (including, specifically, for PNPS) and relevant precedent, the Economic Impact Report does not address non-use benefits of retrofitting any of these technologies at PNPS. See Comment ID 316bEFR.029.042, Response to Public Comment, CWA Section 316(b) Phase II Existing Facilities Rule – Final (Mar. 29, 2004) (“Response to Public Comment”) (EPA response to Entergy comment challenging non-use benefit assessment methods used in site-specific “case studies” to evaluate impingement mortality and entrainment costs, signaling “unavoidable uncertainty” in quantifying and monetizing such benefits using currently available methods.). In particular, after acknowledging that “estimating non-use values is an extremely challenging and uncertain exercise” during the rule-making process, 68 Fed. Reg. at 13579, EPA concluded that “none of the methods it considered for assessing non-use benefits provided results that were appropriate to be included in this final rule,” and instead “decided to rely on a qualitative discussion of non-use benefits.” 69 Fed. Reg. at 41624. According to EPA, “[t]he uncertainties and methodological issues raised in the approaches considered” led it to discard the non-use benefit assessment effort for the Rule. *Id.*

In addition, consistent with applicable law and to provide EPA with insight into the effects of certain decision-making, the Economic Impact Report supplements its social cost-benefit assessment with an analysis of the impacts of the loss of output from the Station, and comparable New England nuclear units, to electric-system reliability and electricity pricing. See, e.g., 33 U.S.C. §§ 1311(b)(2) and 1314(b); *Riverkeeper II*, 475 F.3d at 105 (“EPA could rely on factors

<sup>11</sup> EPA has stated it may establish CWIS requirements for existing facilities in NPDES permits issued on a “best professional judgment” (“BPJ”)-based, case-by-case basis. See, e.g., Brayton Point Determination Document, at 7-5 (“In the absence of regulations specifying national technology guidelines for CWISs, EPA has been applying, and continues to, apply CWA § 316(b) on a case-by-case, Best Professional Judgment (BPJ) basis.”). However, consistent with EPA’s position in Brayton Point, Entergy seriously questions the legality of EPA’s continued use of BPJ after issuance of the Rule, particularly to apply § 316(b) in a more stringent fashion than the Rule contemplates. See, e.g., *NRDC v. EPA*, 437 F.Supp.2d 1137, 1160 (C.D.Cal. 2006) (BPJ-based permit “was to be only an *interim* measure pending the promulgation of guidelines, limitations, and standards mandated elsewhere in the Act.”) (quoting H.R.Rep. No. 92-911, at 126 (1972)); *id.* at 1160-1161 (“We know of no legal authority stating that the practice of issuing permits based on ‘best professional judgment’ was to be ongoing”) (citation omitted). Thus, Entergy’s request is not only appropriate, but reflects the reasoned legal view.

<sup>12</sup> Given that retrofitting nuclear facilities with closed-cycle cooling is unprecedented, the Economic Impact Report has, in its sensitivity analysis of the assisted recirculation system, used EPA’s determination that a ten-month outage period “could reasonably be expected based on its case studies for the proposed Phase II Rule.” See 69 Fed. Reg. 41576, 41605 (July 9, 2004).



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other than I&E in establishing BTA, such as negative environmental impacts or concerns about energy production and efficiency.”). As more fully described in the Economic Impact Report, significant, and in certain instances extreme, adverse impacts to system-wide reliability and pricing would result.<sup>13</sup> Because of the substantial risks to electric-system function, Entergy will provide complete copies of this response to the Federal Energy Regulatory Commission (“FERC”) in furtherance of its regulatory responsibility under the Energy Policy Act of 2005 to ensure system-wide reliability, and to Independent System Operator-New England (“ISO-NE”) in furtherance of its role as the regional guarantor of electric-system reliability, among other relevant authorities.

#### IV. CONCLUSION

Please be advised that the Economic Impact Report is, fundamentally and throughout, an assessment of potential electric-system function as a result of EPA decision-making, including because it contains projections regarding possible electricity-pricing and emission-pricing impacts, and therefore must be considered “confidential business information” under 40 C.F.R. Part 2, Subpart B and Massachusetts law. To that end, Entergy hereby asserts a claim of business confidentiality with regard to the Economic Impact Report in its entirety, and specifically requests that EPA handle the entire Economic Impact Report in accordance with 40 C.F.R. Part 2, Subpart B. The information contained in the Economic Impact Report, if released to competitors or the public, has the potential to affect market pricing, and electric consumers, as well. For these reasons, we expect that EPA will undertake not only to ensure that the confidential business information, but also the electric system and electricity consumers, are adequately safeguarded. Certain sections of other Reports, which reflect outage periods and other operational considerations that may likewise have a market impact, also must be

<sup>13</sup> As the North American Electric Reliability Corporation (“NERC”), the organization charged by FERC with ensuring the reliability of the nation’s electric system, recently stated:

[R]etrofitting existing power plants with cooling towers can reduce the capacity of those plants, which will exacerbate the supply concerns identified in ... this assessment. In some cases, retrofits may prove so costly that plants are retired earlier than projected, with the consequent loss of the plant’s entire capacity. At a time when additional electricity generating resources are needed, the loss of existing generating capacity would undermine U.S. efforts to meet the growing demand for electricity.

See NERC, 2007-2016 Long-Term Reliability Assessment (2007-2016), at 12 (Oct. 2007); see also *id.* at 97 (“Department of Energy (DOE) has estimated that retrofitting cooling towers to a fossil or nuclear electric generating plant would result in a loss of net generation output of 2.4 to 4.0 percent during summer peak load periods. Considering that there are over 440,000 MW of generating capacity in the U.S. using once-through cooling systems, retrofitting could result in a reduction of nearly 18,000 MW in the U.S., representing a 12 percent reduction in available capacity margin. Besides the de-rating of existing units, the costs of retrofitting cooling towers for many older plants may be prohibitive and some may be retired potentially jeopardizing resource adequacy in many regions of the U.S.”).



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considered "confidential business information" under 40 C.F.R. Part 2, Subpart B and Massachusetts law. These are specifically designated.<sup>14</sup>

Consistent with the request (above), Entergy respectfully reserves its right to supplement its response to the §308 Letter as necessary to respond to any further direction provided as a result of the Supreme Court's decision relating to *Riverkeeper II*, including without limitation by asserting its right to available variances, exemptions and/or modifications under CWA §301, particularly §301(g). Please be further advised that Entergy maintains the positions it has previously stated, in correspondence to and discussions with EPA staff, with respect to EPA's interpretation and application of certain aspects of the Rule, and respectfully reserves all rights with respect to the application of §316(a and b) to PNPS. Nothing herein shall be construed as a waiver of any such right.

We look forward to scheduling the meetings requested in this correspondence and to the cooperative resolution of PNPS' NPDES Permit renewal application. As always, thank you for your prompt attention to this matter, and do not hesitate to contact me with any questions or concerns you or your staff may have.

Sincerely,

  
Elise N. Zoli

ENZ:tag

Enclosures

cc: Glenn Haas, Director, Division of Watershed Management, Massachusetts  
Department of Environmental Protection  
PATC Distribution List (*without enclosures*)  
David M. Webster, Manager, Massachusetts State Program, EPA Region 1 (*without enclosures*)  
John Moskal, Senior Energy Advisor, EPA Region 1 (*without enclosures*)  
Chuck D. Barlow, Esq., Assistant General Counsel – Environmental  
Ricky N. Buckley, Manager, Fleet Environmental Protection (*without enclosures*)  
Jacob J. Scheffer, Resource Team Superintendent

<sup>14</sup> For convenience, we have provided EPA both complete and redacted hard copies of the Reports, while the copies submitted on CDs reflect only the non-redacted versions.



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**Attachments**

Affidavit of Lawrence W. Barnthouse, PH.D., LWB Environmental Services, Inc.

Affidavit of Mark T. Mattson, PH.D., Normandeau Associates, Inc.

Affidavit of Michael D. Scherer, PH.D., Normandeau Associates, Inc.

Affidavit of Douglas G. Heimbuch, PH.D., AKRF, Inc.

Affidavit of Sam R. Beaver, Enercon Services, Inc.

Affidavit of David Harrison, Jr. Ph.D., NERA Economic Consulting

Affidavit of Albert Nichols, Ph.D., NERA Economic Consulting